APPENDIX 10F

Chemical Engineering Design Criteria

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10F1 Introduction

This appendix summarizes the codes, standards, criteria and practices that will be generally used in the design and installation for chemical engineering systems for the Facility. More specific project information will be developed prior to construction of the project to support detailed design, engineering, material procurement specification and construction specifications as required by the California Energy Commission (CEC).

10F2 Design Codes and Standards

The design and specification of all work will be in accordance with the laws and regulations of the federal government and the state of California. Industry codes and standards partially unique to chemical engineering design to be used in design and construction are summarized below:

- ANSI—American National Standards Institute
- ANSI B31.1—Power Piping Code
- ASME—American Society of Mechanical Engineers
- ASME—Performance Test Code 31, Ion Exchange Equipment
- ASTM—American Society for Testing and Materials
- ASTM D859-94—Referee Method B for Silica as SiO_2
- ASTM D888-96—Referee Method A for Dissolved Oxygen
- ASTM D513-96—Referee Method D for CO_2
- OSHA—Occupational Safety and Health Administration
- SSPC—Steel Structures Painting Council Standards
- SSPC SP3—Power Tool Cleaning
- SSPC SP7—Brush-Off Blast Cleaning
- SSPC SP1—Solvent Cleaning
- SSPC SP6—Commercial Blast Cleaning
- SSPC SP5—White Metal Blast Cleaning
- UL—Underwriters Laboratories
- AWWA—American Waterworks Association
- WWA 2540-95—Method C for TDS

Other recognized standards will be used as required to serve as design, fabrication, and construction guidelines when not in conflict with the above listed standards.

The codes and industry standards used for design, fabrication, and construction will be the codes and industry standards, including all addenda, in effect as stated in equipment and construction purchase or contract documents.

10F3 General Criteria

10F3.1 Design Water Quality

10F3.1.1 Circulating Water

Recycled water produced by the recycled water treatment facility at the ERP will supply the project with circulating water makeup. Data from the City of San Francisco Southeast Wastewater Treatment Plant (SEWWTP) indicate that the effluent from the recycled water treatment facility will have the characteristics defined in Subsection 8.14, Water Resources.

10F3.1.2 Service Water

Recycled water from the recycled water treatment facility will be used to supply the project with all general service water requirements such as non-potable sanitary as well as process needs.

A typical water analysis range for this water is presented in Subsection 8.14.

10F3.1.3 Water Treatment

Recycled water from the recycled water treatment facility will be supplied to the plant Water Treatment System. The high quality effluent from the Water Treatment System will serve as injection water to the gas turbine NOx reduction system. In addition, treated water will be used also to supply water for turbine power augmentation, turbine water wash, and various uses during unit startup.

Treated water will be the highest quality practical. Minimum quality requirements will be as follows.

- Total dissolved solids – 3mg/l
- Silica as SiO_2 – 0.1 mg/l
- Specific conductance at demineralizer effluent – 0.5 μS/cm
- pH – 6.5 to 7.5

10F3.1.4 Construction Water

Water for use during construction will be supplied from the City of San Francisco's potable water system.

10F3.1.5 Fire Protection Water

The source of water for fire protection will be from a connection to the City's fire water system located in 25th Street.

10F3.2 Chemical Conditioning

10F3.2.1 Circulating Water System Chemical Conditioning

Circulating water chemical conditioning will consist of chemicals to minimize corrosion and to control the formation of mineral scale and biofouling. Corrosion and scaling will be controlled by the use of sulfuric acid for alkalinity adjustment in conjunction with

inhibitors, as required, for scale and corrosion control. Chlorination utilizing sodium hypochlorite will be used to minimize biofouling of the cooling tower.

10F3.3 Chemical Storage

10F3.3.1 Storage Capacity

Chemical storage tanks will, in general, be sized to store a minimum of 1.5 times the normal bulk shipment. The minimum acceptable volume of the SCR aqueous ammonia storage tank will provide at least 3 days storage.

10F3.3.2 Containment

Chemical storage tanks containing corrosive or hazardous fluids will be surrounded by curbing. Curbing and drain piping design will allow a full tank capacity spill without overflowing the curbing. For multiple tanks located within the same curbed area, the largest single tank will be used to size the curbing and drain piping.

10F3.3.3 Closed Drains

Waste piping for volatile liquids and wastes with offensive odors will use closed drains to control noxious fumes and vapors.

10F3.3.4 Coatings

Tanks, piping, and curbing for chemical storage applications will be provided with a protective coating system. The specific requirements for selection of an appropriate coating will be identified prior to equipment and construction contract procurements.

10F3.4 Wastewater Treatment

Any plant process wastewaters will be collected in the plant wastewater collection system for offsite discharge. Plant effluent to be discharged offsite will meet all applicable criteria of federal, state, and local permits.

Sanitary wastewater will be collected and sent to the city sanitary sewer system through a connection to the line in Cesar Chavez Street.